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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Yu et al.

Art Unit: 1646

Application No.: 09/507,968

Examiner: S. Prasad

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For: **Neutrokin-alpha and Neutrokin-alpha
Splice Variant**

CLEAN VERSION OF THE ENTIRE SET OF PENDING CLAIMS

UNDER 37 C.F.R. § 1.121(c)(3)

26. (Amended) An isolated protein comprising an amino acid sequence selected from the group consisting of:

(a) the amino acid sequence of amino acid residues 1 to 285 of SEQ ID NO:2; and

(b) the amino acid sequence of amino acid residues 73 to 285 of SEQ ID NO:2.

27. The protein of claim 26 which comprises amino acid sequence (a).

28. The protein of claim 26 which comprises amino acid sequence (b).

29. (Cancelled)

30. (Cancelled)

31. The protein of claim 26 wherein the protein also comprises a heterologous amino acid sequence.

32. The protein of claim 31 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.

33. The protein of claim 26 wherein said protein is labeled.
34. The protein of claim 33 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.
35. The protein of claim 26 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.
36. The protein of claim 26 bound to a solid support.
37. A composition comprising the protein of claim 26 and a carrier.
38. A protein produced by a method comprising:
- (a) expressing the protein of claim 26 by a cell; and
 - (b) recovering the protein.
39. (Amended) An isolated protein comprising a first amino acid sequence that is 90% or more identical to a second amino acid sequence selected from the group consisting of:
- (a) the amino acid sequence of amino acid residues 1 to 285 of SEQ ID NO:2; and
 - (b) the amino acid sequence of amino acid residues 73 to 285 of SEQ ID NO:2;
- wherein said protein modulates leukocyte proliferation, differentiation or survival.
40. The protein of claim 39 wherein the second amino acid sequence is (a).

41. The protein of claim 39 wherein the second amino acid sequence is (b).
42. (Cancelled)
43. (Cancelled)
44. The protein of claim 39 wherein said first amino acid sequence is 95% or more identical to said second amino acid sequence.
45. The protein of claim 44 wherein the second amino acid sequence is the amino acid sequence of amino acid residues 1 to 285 of SEQ ID NO:2.
46. (Cancelled)
47. (Cancelled)
48. The protein of claim 44 wherein the second amino acid sequence is the amino acid sequence of amino acid residues 73 to 285 of SEQ ID NO:2.
49. The protein of claim 39 wherein the protein also comprises a heterologous amino acid sequence.
50. The protein of claim 49 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
51. The protein of claim 39 wherein said protein is labeled.
52. The protein of claim 51 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.

53. The protein of claim 39 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

54. The protein of claim 39 bound to a solid support.

55. A composition comprising the protein of claim 39 and a carrier.

56. A protein produced by a method comprising:

- (a) expressing the protein of claim 39 by a cell; and
- (b) recovering the protein.

57. (Amended) An isolated protein comprising an amino acid sequence selected from the group consisting of:

(a) the amino acid sequence of amino acid residues n to 285 of SEQ ID NO:2, where n is an integer in the range of 2-190;

(b) the amino acid sequence of amino acid residues 1 to m of SEQ ID NO:2, where m is an integer in the range of 274-284; and

(c) the amino acid sequence of amino acid residues n to m of SEQ ID NO:2, where n is an integer in the range of 2-190 and m is an integer in the range of 274-284;

wherein said protein modulates leukocyte proliferation, differentiation or survival.

58. The protein of claim 57 which comprises amino acid sequence (a).

59. The protein of claim 57 which comprises amino acid sequence (b).

60. The protein of claim 57 which comprises amino acid sequence (c).

61. The protein of claim 57 which comprises the amino acid sequence of amino acid residues 71-285 of SEQ ID NO:2.

62. The protein of claim 57 wherein the protein modulates leukocyte proliferation.
63. The protein of claim 62 wherein the leukocyte is a lymphocyte.
64. The protein of claim 57 wherein the protein stimulates leukocyte proliferation.
65. The protein of claim 64 wherein the leukocyte is a lymphocyte.
66. The protein of claim 57 wherein the protein modulates leukocyte differentiation.
67. The protein of claim 66 wherein the leukocyte is a lymphocyte.
68. The protein of claim 57 wherein the protein stimulates leukocyte differentiation.
69. The protein of claim 68 wherein the leukocyte is a lymphocyte.
70. The protein of claim 57 wherein the protein also comprises a heterologous amino acid sequence.
71. The protein of claim 70 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
72. The protein of claim 57 wherein said protein is labeled.

73. The protein of claim 72 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

74. The protein of claim 57 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

75. The protein of claim 57 bound to a solid support.

76. A composition comprising the protein of claim 57 and a carrier.

77. A protein produced by a method comprising:

- (a) expressing the protein of claim 57 by a cell; and
- (b) recovering the protein.

78. (Amended) An isolated protein comprising a first amino acid sequence that is 95% or more identical to a second amino acid sequence selected from the group consisting of:

(a) the amino acid sequence of amino acid residues n to 285 of SEQ ID NO:2, where n is an integer in the range of 2-190;

(b) the amino acid sequence of amino acid residues 1 to m of SEQ ID NO:2, where m is an integer in the range of 274-284; and

(c) the amino acid sequence of amino acid residues n to m of SEQ ID NO:2, where n is an integer in the range of 2-190 and m is an integer in the range of 274-284; and

wherein said protein modulates leukocyte proliferation, differentiation or survival.

79. The protein of claim 78 wherein the second amino acid sequence is (a).
80. The protein of claim 78 wherein the second amino acid sequence is (b).
81. The protein of claim 78 wherein the second amino acid sequence is (c).
82. (Cancelled)
83. The protein of claim 79 wherein the second amino acid sequence is the amino acid sequence of amino acid residues 168-285 of SEQ ID NO:2.
84. The protein of claim 79 wherein the second amino acid sequence is the amino acid sequence of amino acid residues 112-285 of SEQ ID NO:2.
85. The protein of claim 79 wherein the second amino acid sequence is the amino acid sequence of amino acid residues 81-285 of SEQ ID NO:2.
86. The protein of claim 79 wherein the second amino acid sequence is the amino acid sequence of amino acid residues 71-285 of SEQ ID NO:2.
87. The protein of claim 78 wherein the protein modulates leukocyte proliferation.
88. The protein of claim 87 wherein the leukocyte is a lymphocyte.
89. The protein of claim 78 wherein the protein stimulates leukocyte proliferation.
90. The protein of claim 89 wherein the leukocyte is a lymphocyte.
91. The protein of claim 78 wherein the protein modulates leukocyte differentiation.
92. The protein of claim 91 wherein the leukocyte is a lymphocyte.

93. The protein of claim 78 wherein the protein stimulates leukocyte differentiation.
94. The protein of claim 93 wherein the leukocyte is a lymphocyte.
95. The protein of claim 78 wherein the protein also comprises a heterologous amino acid sequence.
96. The protein of claim 95 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
97. The protein of claim 78 wherein said protein is labeled.
98. The protein of claim 97 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.
99. The protein of claim 78 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.
100. The protein of claim 78 bound to a solid support.
101. A composition comprising the protein of claim 78 and a carrier.
102. A protein produced by a method comprising:
- (a) expressing the protein of claim 78 by a cell; and
 - (b) recovering the protein.

103. (Amended) An isolated protein comprising the amino acid sequence of amino acid residues 191-285 of SEQ ID NO:2, wherein said protein modulates leukocyte proliferation, differentiation or survival.

104. The isolated protein of claim 103 which comprises the amino acid sequence of amino acid residues 168-285 of SEQ ID NO:2.

105. The isolated protein of claim 104 which comprises the amino acid sequence of amino acid residues 112-285 of SEQ ID NO:2.

106. The isolated protein of claim 105 which comprises the amino acid sequence of amino acid residues 81-285 of SEQ ID NO:2.

107. The isolated protein of claim 106 which comprises the amino acid sequence of amino acid residues 71-285 of SEQ ID NO:2.

108. The protein of claim 103 wherein the protein modulates leukocyte proliferation.

109. The protein of claim 108 wherein the leukocyte is a lymphocyte.

110. The protein of claim 103 wherein the protein stimulates leukocyte proliferation.

111. The protein of claim 110 wherein the leukocyte is a lymphocyte.

112. The protein of claim 103 wherein the protein modulates leukocyte differentiation.

113. The protein of claim 112 wherein the leukocyte is a lymphocyte.

114. The protein of claim 103 wherein the protein stimulates leukocyte differentiation.

115. The protein of claim 114 wherein the leukocyte is a lymphocyte.
116. The protein of claim 103 wherein the protein also comprises a heterologous amino acid sequence.
117. The protein of claim 116 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
118. The protein of claim 103 wherein said protein is labeled.
119. The protein of claim 118 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.
120. The protein of claim 103 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.
121. The protein of claim 103 bound to a solid support.
122. A composition comprising the protein of claim 103 and a carrier.
123. A protein produced by a method comprising:
- (a) expressing the protein of claim 103 by a cell; and
 - (b) recovering the protein.
124. An isolated protein consisting of the amino acid sequence of amino acid residues 134-285 of SEQ ID NO:2.

125. The protein of claim 124 wherein said protein specifically binds an antibody that specifically binds the protein of SEQ ID NO:2.

126. The protein of claim 124 wherein the protein modulates leukocyte proliferation.

127. The protein of claim 126 wherein the leukocyte is a lymphocyte.

128. The protein of claim 124 wherein the protein stimulates leukocyte proliferation.

129. The protein of claim 128 wherein the leukocyte is a lymphocyte.

130. The protein of claim 124 wherein the protein modulates leukocyte differentiation.

131. The protein of claim 130 wherein the leukocyte is a lymphocyte.

132. The protein of claim 124 wherein the protein stimulates leukocyte differentiation.

133. The protein of claim 132 wherein the leukocyte is a lymphocyte.

134. The protein of claim 124 fused to a heterologous amino acid sequence.

135. The protein of claim 134 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.

136. The protein of claim 124 wherein said protein is labeled.

137. The protein of claim 136 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

138. The protein of claim 124 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

139. The protein of claim 124 bound to a solid support.

140. A composition comprising the protein of claim 124 and a carrier.

141. A protein produced by a method comprising:

- (a) expressing the protein of claim 124 by a cell; and
- (b) recovering the protein.

142. An isolated protein comprising the amino acid sequence of amino acid residues 134-285 of SEQ ID NO:2.

143. The protein of claim 142 wherein said protein specifically binds an antibody that specifically binds the protein of SEQ ID NO:2.

144. The protein of claim 142 wherein the protein modulates leukocyte proliferation.

145. The protein of claim 144 wherein the leukocyte is a lymphocyte.

146. The protein of claim 142 wherein the protein stimulates leukocyte proliferation.

147. The protein of claim 146 wherein the leukocyte is a lymphocyte.
148. The protein of claim 142 wherein the protein modulates leukocyte differentiation.
149. The protein of claim 148 wherein the leukocyte is a lymphocyte.
150. The protein of claim 142 wherein the protein stimulates leukocyte differentiation.
151. The protein of claim 150 wherein the leukocyte is a lymphocyte.
152. The protein of claim 142 wherein the protein also comprises a heterologous amino acid sequence.
153. The protein of claim 152 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
154. The protein of claim 142 wherein said protein is labeled.
155. The protein of claim 154 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.
156. The protein of claim 142 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.
157. The protein of claim 142 bound to a solid support.
158. A composition comprising the protein of claim 142 and a carrier.

159. A protein produced by a method comprising:
- (a) expressing the protein of claim 142 by a cell; and
 - (b) recovering the protein.

160. (Amended) An isolated protein consisting of an amino acid sequence that is 90% or more identical to the amino acid sequence of amino acid residues 134-285 of SEQ ID NO:2, wherein said protein modulates leukocyte proliferation, differentiation or survival.

161. The isolated protein of claim 160 that is 95% or more identical to an amino acid sequence consisting of amino acid residues 134-285 of SEQ ID NO:2.

162. The protein of claim 160 wherein the protein modulates leukocyte proliferation.

163. The protein of claim 162 wherein the leukocyte is a lymphocyte.

164. The protein of claim 160 wherein the protein stimulates leukocyte proliferation.

165. The protein of claim 164 wherein the leukocyte is a lymphocyte.

166. The protein of claim 160 wherein the protein modulates leukocyte differentiation.

167. The protein of claim 166 wherein the leukocyte is a lymphocyte.

168. The protein of claim 160 wherein the protein stimulates leukocyte differentiation.

169. The protein of claim 168 wherein the leukocyte is a lymphocyte.

170. The protein of claim 160 wherein the protein is fused to a heterologous amino acid sequence.

171. The protein of claim 170 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.

172. The protein of claim 160 wherein said protein is labeled.

173. The protein of claim 172 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

174. The protein of claim 160 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

175. The protein of claim 160 bound to a solid support.

176. A composition comprising the protein of claim 160 and a carrier.

177. A protein produced by a method comprising:

- (a) expressing the protein of claim 160 by a cell; and
- (b) recovering the protein.

178. (Amended) An isolated protein comprising an amino acid sequence that is 90% or more identical to the amino acid sequence of amino acid residues 134-285 of SEQ ID NO:2, wherein said protein modulates leukocyte proliferation, differentiation or survival.

179. The isolated protein of claim 178 that is 95% or more identical to an amino acid sequence comprising amino acid residues 134-285 of SEQ ID NO:2.

180. The protein of claim 178 wherein the protein modulates leukocyte proliferation.
181. The protein of claim 180 wherein the leukocyte is a lymphocyte.
182. The protein of claim 178 wherein the protein stimulates leukocyte proliferation.
183. The protein of claim 182 wherein the leukocyte is a lymphocyte.
184. The protein of claim 178 wherein the protein modulates leukocyte differentiation.
185. The protein of claim 184 wherein the leukocyte is a lymphocyte.
186. The protein of claim 178 wherein the protein stimulates leukocyte differentiation.
187. The protein of claim 186 wherein the leukocyte is a lymphocyte.
188. The protein of claim 178 wherein the protein also comprises a heterologous amino acid sequence.
189. The protein of claim 188 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
190. The protein of claim 178 wherein said protein is labeled.

191. The protein of claim 190 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

192. The protein of claim 178 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

193. The protein of claim 178 bound to a solid support.

194. A composition comprising the protein of claim 178 and a carrier.

195. A protein produced by a method comprising:

- (a) expressing the protein of claim 178 by a cell; and
- (b) recovering the protein.

196. An isolated protein comprising a fragment of the polypeptide of SEQ ID NO:2, wherein said fragment modulates leukocyte proliferation, differentiation or survival.

197. The protein of claim 196 wherein the protein modulates leukocyte proliferation.

198. The protein of claim 197 wherein the leukocyte is a lymphocyte.

199. The protein of claim 196 wherein the protein stimulates leukocyte proliferation.

200. The protein of claim 199 wherein the leukocyte is a lymphocyte.

201. The protein of claim 196 wherein the protein modulates leukocyte differentiation.
202. The protein of claim 201 wherein the leukocyte is a lymphocyte.
203. The protein of claim 196 wherein the protein stimulates leukocyte differentiation.
204. The protein of claim 203 wherein the leukocyte is a lymphocyte.
205. The protein of claim 196 wherein the protein also comprises a heterologous amino acid sequence.
206. The protein of claim 205 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
207. The protein of claim 196 wherein said protein is labeled.
208. The protein of claim 207 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.
209. The protein of claim 196 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.
210. The protein of claim 196 bound to a solid support.
211. A composition comprising the protein of claim 196 and a carrier.

212. A protein produced by a method comprising:
- (a) expressing the protein of claim 196 by a cell; and
 - (b) recovering the protein.

213. (Amended) An isolated protein comprising an amino acid sequence of at least 30 contiguous amino acid residues of SEQ ID NO:2 wherein said protein modulates leukocyte proliferation, differentiation or survival.

214. (Cancelled)

215. The protein of claim 213 which comprises an amino acid sequence of at least 50 contiguous amino acid residues of SEQ ID NO:2.

216. The protein of claim 213 wherein the protein modulates leukocyte proliferation.

217. The protein of claim 216 wherein the leukocyte is a lymphocyte.

218. The protein of claim 213 wherein the protein stimulates leukocyte proliferation.

219. The protein of claim 218 wherein the leukocyte is a lymphocyte.

220. The protein of claim 213 wherein the protein modulates leukocyte differentiation.

221. The protein of claim 220 wherein the leukocyte is a lymphocyte.

222. The protein of claim 213 wherein the protein stimulates leukocyte differentiation.

223. The protein of claim 222 wherein the leukocyte is a lymphocyte.

224. (Cancelled)

225. (Amended) The protein of claim 213 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.

226. The protein of claim 213 wherein said protein is labeled.

227. The protein of claim 226 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

228. The protein of claim 213 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

229. The protein of claim 213 bound to a solid support.

230. A composition comprising the protein of claim 213 and a carrier.

231. A protein produced by a method comprising:

- (a) expressing the protein of claim 213 by a cell; and
- (b) recovering the protein.

232. (Amended) An isolated protein consisting of a fragment of SEQ ID NO:2 fused to a heterologous amino acid sequence, wherein said fragment comprises an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence of amino acid residues 115 to 147 of SEQ ID NO:2;
- (b) the amino acid sequence of amino acid residues 150 to 163 of SEQ ID NO:2;
- (c) the amino acid sequence of amino acid residues 171 to 194 of SEQ ID NO:2;
- (d) the amino acid sequence of amino acid residues 223 to 247 of SEQ ID NO:2; and
- (e) the amino acid sequence of amino acid residues 271 to 278 of SEQ ID NO:2.

233. (Amended) The protein of claim 232 wherein said fragment comprises amino acid sequence (a).

234. (Amended) The protein of claim 232 wherein said fragment comprises amino acid sequence (b).

235. (Amended) The protein of claim 232 wherein said fragment comprises amino acid sequence (c).

236. (Amended) The protein of claim 235 wherein said fragment also comprises amino acid sequence (d).

237. (Amended) The protein of claim 232 wherein said fragment comprises amino acid sequence (d).

238. (Amended) The protein of claim 232 wherein said fragment comprises amino acid sequence (e).

239. (Cancelled)

240. (Amended) The protein of claim 232 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.

241. The protein of claim 232 wherein said protein is labeled.

242. The protein of claim 241 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

243. The protein of claim 232 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

244. The protein of claim 232 bound to a solid support.

245. A composition comprising the protein of claim 232 and a carrier.

246. A protein produced by a method comprising:

- (a) expressing the protein of claim 232 by a cell; and
- (b) recovering the protein.

247. (Amended) An isolated protein comprising an amino acid sequence selected from the group consisting of:

(a) the amino acid sequence of an amino-terminal deletion protein mutant of the full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said amino-terminal deletion protein mutant excludes up to 190 amino acid residues from the amino terminus of said full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768;

(b) the amino acid sequence of a carboxy-terminal deletion protein mutant of the full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said carboxy-terminal deletion protein mutant excludes up to 11 amino acid residues from the carboxy terminus of said full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768; and

(c) the amino acid sequence of an amino- and carboxy-terminal deletion protein mutant of the full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said amino- and carboxy-terminal deletion protein mutant excludes up to 190 amino acid residues from the amino terminus and up to 11 amino acid residues from the carboxy terminus of said said full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768;

wherein said protein modulates leukocyte proliferation, differentiation or survival.

248. The protein of claim 247 which comprises amino acid sequence (a).

249. The protein of claim 247 which comprises amino acid sequence (b).

250. The protein of claim 247 which comprises amino acid sequence (c).

251. The protein of claim 248 which excludes 133 amino acid residues from the amino terminus of the full length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768.

252. The protein of claim 247 wherein the protein modulates leukocyte proliferation.
253. The protein of claim 252 wherein the leukocyte is a lymphocyte.
254. The protein of claim 247 wherein the protein stimulates leukocyte proliferation.
255. The protein of claim 254 wherein the leukocyte is a lymphocyte.
256. The protein of claim 247 wherein the protein modulates leukocyte differentiation.
257. The protein of claim 256 wherein the leukocyte is a lymphocyte.
258. The protein of claim 247 wherein the protein stimulates leukocyte differentiation.
259. The protein of claim 258 wherein the leukocyte is a lymphocyte.
260. The protein of claim 247 wherein the protein also comprises a heterologous amino acid sequence.
261. The protein of claim 260 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
262. The protein of claim 247 wherein said protein is labeled.

263. The protein of claim 262 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

264. The protein of claim 247 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

265. The protein of claim 247 bound to a solid support.

266. A composition comprising the protein of claim 247 and a carrier.

267. A protein produced by a method comprising:

- (a) expressing the protein of claim 247 by a cell; and
- (b) recovering the protein.

268. (Amended) An isolated protein comprising a first amino acid sequence that is 95% or more identical to a second amino acid sequence selected from the group consisting of:

(a) the amino acid sequence of an amino-terminal deletion protein mutant of the full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said amino-terminal deletion protein mutant excludes up to 190 amino acid residues from the amino terminus of said full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768;

(b) the amino acid sequence of a carboxy-terminal deletion protein mutant of the full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said carboxy-terminal deletion protein mutant excludes up to 11 amino acid residues from the carboxy terminus of said full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768; and

(c) the amino acid sequence of an amino- and carboxy-terminal deletion protein mutant of the full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said amino- and carboxy-terminal deletion protein mutant excludes up to 190 amino acid residues from the amino terminus and up to 11 amino acid residues from the carboxy terminus of said said full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768;

wherein said protein modulates leukocyte proliferation, differentiation or survival.

269. The protein of claim 268 which comprises amino acid sequence (a).

270. The protein of claim 268 which comprises amino acid sequence (b).

271. The protein of claim 268 which comprises amino acid sequence (c).

272. The protein of claim 269 which excludes 190 amino acid residues from the amino terminus of the full length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768.

273. (Amended) The protein of claim 269 which excludes 71 amino acid residues from the amino terminus of the full length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768.

274. The protein of claim 268 wherein the protein modulates leukocyte proliferation.

275. The protein of claim 273 wherein the leukocyte is a lymphocyte.

276. The protein of claim 268 wherein the protein stimulates leukocyte proliferation.

277. The protein of claim 276 wherein the leukocyte is a lymphocyte.

278. The protein of claim 268 wherein the protein modulates leukocyte differentiation.

279. The protein of claim 278 wherein the leukocyte is a lymphocyte.

280. The protein of claim 268 wherein the protein stimulates leukocyte differentiation.

281. The protein of claim 280 wherein the leukocyte is a lymphocyte.

282. The protein of claim 268 wherein the protein also comprises a heterologous amino acid sequence.

283. The protein of claim 282 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.

284. The protein of claim 268 wherein said protein is labeled.

285. The protein of claim 284 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

286. The protein of claim 268 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

287. The protein of claim 268 bound to a solid support.

288. A composition comprising the protein of claim 268 and a carrier.

289. A protein produced by a method comprising:

- (a) expressing the protein of claim 268 by a cell; and
- (b) recovering the protein.

290. (Amended) An isolated protein comprising a first amino acid sequence that is 95% or more identical to a second amino acid sequence consisting of the amino acid sequence of an amino-terminal deletion protein mutant of the full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said amino-terminal deletion protein mutant excludes up to 133 amino acid residues from the amino terminus of said full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, and wherein said protein modulates leukocyte proliferation, differentiation or survival.

291. The protein of claim 290 wherein the protein modulates leukocyte proliferation.

292. The protein of claim 291 wherein the leukocyte is a lymphocyte.

293. The protein of claim 290 wherein the protein stimulates leukocyte proliferation.
294. The protein of claim 293 wherein the leukocyte is a lymphocyte.
295. The protein of claim 290 wherein the protein modulates leukocyte differentiation.
296. The protein of claim 295 wherein the leukocyte is a lymphocyte.
297. The protein of claim 290 wherein the protein stimulates leukocyte differentiation.
298. The protein of claim 297 wherein the leukocyte is a lymphocyte.
299. The protein of claim 290 wherein the protein also comprises a heterologous amino acid sequence.
300. The protein of claim 299 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
301. The protein of claim 290 wherein said protein is labeled.
302. The protein of claim 301 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.
303. The protein of claim 290 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

304. The protein of claim 290 bound to a solid support.
305. A composition comprising the protein of claim 290 and a carrier.
306. A protein produced by a method comprising:
- (a) expressing the protein of claim 290 by a cell; and
 - (b) recovering the protein.
307. (Amended) An isolated protein consisting of a first amino acid sequence that is 95% or more identical to a second amino acid sequence consisting of the amino acid sequence of an amino-terminal deletion protein mutant of the full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said amino-terminal deletion protein mutant excludes up to 133 amino acid residues from the amino terminus of said full-length protein encoded by the cDNA clone contained in ATCC Deposit Number 97768, and wherein said protein modulates leukocyte proliferation, differentiation or survival.
308. The protein of claim 307 wherein the protein modulates leukocyte proliferation.
309. The protein of claim 308 wherein the leukocyte is a lymphocyte.
310. The protein of claim 307 wherein the protein stimulates leukocyte proliferation.
311. The protein of claim 310 wherein the leukocyte is a lymphocyte.
312. The protein of claim 307 wherein the protein modulates leukocyte differentiation.
313. The protein of claim 312 wherein the leukocyte is a lymphocyte.

314. The protein of claim 307 wherein the protein stimulates leukocyte differentiation.
315. The protein of claim 314 wherein the leukocyte is a lymphocyte.
316. The protein of claim 307 fused to a heterologous amino acid sequence.
317. The protein of claim 316 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
318. The protein of claim 307 wherein said protein is labeled.
319. The protein of claim 318 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.
320. The protein of claim 307 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.
321. The protein of claim 307 bound to a solid support.
322. A composition comprising the protein of claim 307 and a carrier.
323. A protein produced by a method comprising:
- (a) expressing the protein of claim 307 by a cell; and
 - (b) recovering the protein.

324. An isolated protein comprising a fragment of the polypeptide encoded by the cDNA clone contained in ATCC Deposit Number 97768, wherein said fragment modulates leukocyte proliferation, differentiation or survival.

325. The protein of claim 324 wherein the protein modulates leukocyte proliferation.

326. The protein of claim 325 wherein the leukocyte is a lymphocyte.

327. The protein of claim 324 wherein the protein stimulates leukocyte proliferation.

328. The protein of claim 327 wherein the leukocyte is a lymphocyte.

329. The protein of claim 324 wherein the protein modulates leukocyte differentiation.

330. The protein of claim 329 wherein the leukocyte is a lymphocyte.

331. The protein of claim 324 wherein the protein stimulates leukocyte differentiation.

332. The protein of claim 331 wherein the leukocyte is a lymphocyte.

333. The protein of claim 324 wherein the protein also comprises a heterologous amino acid sequence.

334. The protein of claim 333 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.

335. The protein of claim 324 wherein said protein is labeled.

336. The protein of claim 335 wherein said label is a radiolabel selected from the group consisting of:

- (a) ^{131}I ;
- (b) ^{125}I ;
- (c) ^{121}I ;
- (d) ^{112}In ; and
- (e) $^{99\text{m}}\text{Tc}$.

337. The protein of claim 324 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

338. The protein of claim 324 bound to a solid support.

339. A composition comprising the protein of claim 324 and a carrier.

340. A protein produced by a method comprising:

- (a) expressing the protein of claim 324 by a cell; and
- (b) recovering the protein.

341. (Amended) An isolated protein comprising an amino acid sequence of at least 30 contiguous amino acid residues of the polypeptide encoded by the cDNA clone contained in ATCC Deposit Number 97768 wherein said protein modulates leukocyte proliferation, differentiation or survival.

342. (Cancelled)

343. The protein of claim 342 which comprises an amino acid sequence of at least 50 contiguous amino acid residues of the polypeptide encoded by the cDNA clone contained in ATCC Deposit Number 97768.

344. The protein of claim 341 wherein the protein modulates leukocyte proliferation.

345. The protein of claim 344 wherein the leukocyte is a lymphocyte.
346. The protein of claim 341 wherein the protein stimulates leukocyte proliferation.
347. The protein of claim 346 wherein the leukocyte is a lymphocyte.
348. The protein of claim 341 wherein the protein modulates leukocyte differentiation.
349. The protein of claim 348 wherein the leukocyte is a lymphocyte.
350. The protein of claim 341 wherein the protein stimulates leukocyte differentiation.
351. The protein of claim 350 wherein the leukocyte is a lymphocyte.
352. The protein of claim 341 wherein the protein also comprises a heterologous amino acid sequence.
353. The protein of claim 352 wherein the heterologous amino acid sequence is the amino acid sequence of an immunoglobulin Fc domain.
354. The protein of claim 341 wherein said protein is labeled.
355. The protein of claim 354 wherein said label is a radiolabel selected from the group consisting of:
- (a) ^{131}I ;
 - (b) ^{125}I ;
 - (c) ^{121}I ;
 - (d) ^{112}In ; and
 - (e) $^{99\text{m}}\text{Tc}$.

356. The protein of claim 341 wherein the protein is cytotoxic to Neutrokin- α receptor bearing cells.

357. The protein of claim 341 bound to a solid support.

358. A composition comprising the protein of claim 341 and a carrier.

359. A protein produced by a method comprising:

- (a) expressing the protein of claim 341 by a cell; and
- (b) recovering the protein.

360. The protein of claim 39 wherein the protein modulates leukocyte proliferation.

361. The protein of claim 360 wherein the leukocyte is a lymphocyte.

362. The protein of claim 39 wherein the protein stimulates leukocyte proliferation.

363. The protein of claim 362 wherein the leukocyte is a lymphocyte.

364. The protein of claim 39 wherein the protein modulates leukocyte differentiation.

365. The protein of claim 364 wherein the leukocyte is a lymphocyte.

366. The protein of claim 39 wherein the protein stimulates leukocyte differentiation.

367. The protein of claim 366 wherein the leukocyte is a lymphocyte.

368. The protein of claim 39 wherein the protein modulates leukocyte survival.

369. The protein of claim 368 wherein the leukocyte is a lymphocyte.

- 370. The protein of claim 39 wherein the protein stimulates leukocyte survival.
- 371. The protein of claim 370 wherein the leukocyte is a lymphocyte.
- 372. The protein of claim 57 wherein the protein modulates leukocyte survival.
- 373. The protein of claim 372 wherein the leukocyte is a lymphocyte.
- 374. The protein of claim 57 wherein the protein stimulates leukocyte survival.
- 375. The protein of claim 374 wherein the leukocyte is a lymphocyte.
- 376. The protein of claim 78 wherein the protein modulates leukocyte survival.
- 377. The protein of claim 376 wherein the leukocyte is a lymphocyte.
- 378. The protein of claim 78 wherein the protein stimulates leukocyte survival.
- 379. The protein of claim 378 wherein the leukocyte is a lymphocyte.
- 380. The protein of claim 103 wherein the protein modulates leukocyte survival.
- 381. The protein of claim 380 wherein the leukocyte is a lymphocyte.
- 382. The protein of claim 103 wherein the protein stimulates leukocyte survival.
- 383. The protein of claim 382 wherein the leukocyte is a lymphocyte.
- 384. The protein of claim 160 wherein the protein modulates leukocyte survival.
- 385. The protein of claim 384 wherein the leukocyte is a lymphocyte.
- 386. The protein of claim 160 wherein the protein stimulates leukocyte survival.
- 387. The protein of claim 386 wherein the leukocyte is a lymphocyte.

388. The protein of claim 178 wherein the protein modulates leukocyte survival.
389. The protein of claim 388 wherein the leukocyte is a lymphocyte.
390. The protein of claim 178 wherein the protein stimulates leukocyte survival.
391. The protein of claim 390 wherein the leukocyte is a lymphocyte.
392. The protein of claim 196 wherein the protein modulates leukocyte survival.
393. The protein of claim 392 wherein the leukocyte is a lymphocyte.
394. The protein of claim 196 wherein the protein stimulates leukocyte survival.
395. The protein of claim 394 wherein the leukocyte is a lymphocyte.
396. The protein of claim 213 wherein the protein modulates leukocyte survival.
397. The protein of claim 396 wherein the leukocyte is a lymphocyte.
398. The protein of claim 213 wherein the protein stimulates leukocyte survival.
399. The protein of claim 398 wherein the leukocyte is a lymphocyte.
400. The protein of claim 247 wherein the protein modulates leukocyte survival.
401. The protein of claim 400 wherein the leukocyte is a lymphocyte.
402. The protein of claim 247 wherein the protein stimulates leukocyte survival.
403. The protein of claim 402 wherein the leukocyte is a lymphocyte.
404. The protein of claim 268 wherein the protein modulates leukocyte survival.
405. The protein of claim 404 wherein the leukocyte is a lymphocyte.

- 406. The protein of claim 268 wherein the protein stimulates leukocyte survival.
- 407. The protein of claim 406 wherein the leukocyte is a lymphocyte.
- 408. The protein of claim 290 wherein the protein modulates leukocyte survival.
- 409. The protein of claim 408 wherein the leukocyte is a lymphocyte.
- 410. The protein of claim 290 wherein the protein stimulates leukocyte survival.
- 411. The protein of claim 410 wherein the leukocyte is a lymphocyte.
- 412. The protein of claim 307 wherein the protein modulates leukocyte survival.
- 413. The protein of claim 412 wherein the leukocyte is a lymphocyte.
- 414. The protein of claim 307 wherein the protein stimulates leukocyte survival.
- 415. The protein of claim 414 wherein the leukocyte is a lymphocyte.
- 416. The protein of claim 324 wherein the protein modulates leukocyte survival.
- 417. The protein of claim 416 wherein the leukocyte is a lymphocyte.
- 418. The protein of claim 324 wherein the protein stimulates leukocyte survival.
- 419. The protein of claim 418 wherein the leukocyte is a lymphocyte.
- 420. The protein of claim 341 wherein the protein modulates leukocyte survival.
- 421. The protein of claim 420 wherein the leukocyte is a lymphocyte.
- 422. The protein of claim 341 wherein the protein stimulates leukocyte survival.
- 423. The protein of claim 422 wherein the leukocyte is a lymphocyte.

- 424. A Neutrokin- α multimer comprising the protein of claim 124.
- 425. A Neutrokin- α multimer comprising the protein of claim 142.
- 426. A Neutrokin- α multimer comprising the protein of claim 160.
- 427. A Neutrokin- α multimer comprising the protein of claim 178.
- 428. A Neutrokin- α multimer comprising the protein of claim 290.
- 429. A Neutrokin- α multimer comprising the protein of claim 307.